

Role of various Institutions in providing Technology Support Services to MSEs in Kenya

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Abstract

We base this paper on the premise that the quality of the institutional framework affects the level of social acceptance of policy (such as science and technology policy, and MSE policy), minimizes policy conflicts and enhances the implementation of policy. We review MSE policies and analyze the institutional framework for providing technology services to MSEs in Kenya. We observe that although the country has evolved an MSE policy, the country lacks a coherent and comprehensive science, technology and innovation policy to guide decision-making. A national technology vision is lacking and commercialization of technology, programs for “techno-preneurs” and technology benchmarking are yet to receive policy attention. The institutional structure is diverse but is dominated by the public sector. Institutions range from those providing technology extension, quality and standards, protection of industrial property, innovation and technology development to those involved in policy formulation and planning. However, the functional mandates of some of the institutions create room for competition and wastage of resources since their coordination is weak and the linkages between some of these institutions with MSEs remains inadequate.

Keywords: Micro and Small Enterprises, entrepreneurship, informal sector, technology, innovation

1. Introduction

The Micro and Small Enterprise (MSE)ⁱ sector in Kenya is expected to play a critical role in employment generation, industrial transformation and poverty reduction. The challenges of globalization and liberalization, have posed a threat to the competitiveness and growth prospects for this sector. Technology development and transfers, however, present an opportunity for these enterprises to enhance the quality and quantity of goods they produce and thereby help them withstand local and international competition (ILO/UNDP, 2000).

As endogenous growth theoriesⁱⁱ argue, organizations of all shapes and sizes need to adapt to survive. Central to this is the potential of applying technology as way for adapting and surviving (UNIDO, 2004). By extension, it is not possible for MSEs to grow and become competitive without technological change and the accumulation of knowledge (Buainain, 2002). But this requires innovation, which cannot be cultivated in isolation but needs a wealth of supporting services, infrastructures, institutions and enabling conditionsⁱⁱⁱ (UNIDO, 2004). In developing countries, national innovation systems are weak, science and technology policy does not command as much attention as it should, and institutions of technology are under-funded and ill equipped (Ogbu, 2004).

This study has interest in the institutional framework for several reasons. First, the quality of the institutional framework affects the level of social acceptance of science and technology policy as well as MSE policy. Similarly, it minimizes policy conflicts (by enhancing policy harmony) and resource wastage through duplicative efforts. Fourth, it provides avenues to enhance the capacity to evaluate policy options and carry out their implementation. Finally, the institutional framework affects the levels of productivity and competitiveness, thus enhancing the growth and poverty reduction scope of MSEs.

Ideally, the technology support services should be broad-based, inclusive and reflect the diverse interests in the sector. One of the ways of achieving this is to ensure that institutions and stakeholders involved engage in consultations and coordinate their planning efforts. This also enhances MSE policy formulation and implementation. For Kenya, such institutional framework should reverse the restricted levels of technology and inappropriate technology (Kenya, 1992 and 2005), enable MSE to produce the type of goods that enable them to break into new markets; support MSEs to adapt and absorb modern technological skills; bridge the wide gap between the suppliers of technology and the end users of technology products (Kenya, 2003) and ensure effective technology transfer. This paper reviews the policies and analyses the existing institutional framework. It concludes by drawing lessons from the foregoing.

2. Review of Existing Policy

This section reviews policies supporting technology acquisition and development for Kenyan MSEs. It reveals three clear themes: industrial research (in the early 1980's), market deepening (in the late 1980's) and

technological capability (1990's onwards). In the early 1980's, the main theme was on strengthening industrial research within the MSE sector (Kenya, 1982). Policy intended to make use of financial incentives and legislation to forestall the problem of weak industrial research. Although the policy makes various proposals on technology development and transfer, standardization and innovation, the policies were designed with the large firm in mind (as opposed to MSEs).

Since late 1980s, the focus shifted towards market-based interventions within the MSE sector (Kenya, 1986). The government's role became more facilitative by creating infrastructural facilities and the economic environment for business. The policy sought various measures aimed at new innovative production techniques that would replace imported manufactures; dissemination of new technologies; use of tendering procedures to give preference to MSE bids; new building and architectural codes that favor use of MSEs products. The main problem with the recommendations of these policies is that most of them remain unimplemented to date.

In the 1990's policies aimed at enhancement of technological capability within MSEs were not strikingly different from those of the 1980's although there was a slight change in focus. During this time, the government encouraged research and development, linkages between small and large enterprises (through sub-contracting) and strong support institutions involved in technology development and diffusion (Kenya, 1992). Another important policy was the effort to improve the product and quality of MSEs and exporters through information exchange, *jua kali* technology support and identification of technological and workforce requirements (Kenya, 1997).

In 2000, there were still minimal "innovations" in the policy framework, as most of the elements of policy remained generic. Emphasis was still on enhancement of linkages between small and large enterprises through such measures as institutionalization of business incubation (Kenya, 2003). More recently, the new MSE policy has proposed new and elaborate interventions focused on enhancing; (i) the ability of MSEs to adapt and adopt new technology (ii) the capacity of institutions that support technology development (iii) access to informational available technology (iv) providing technological skills (Kenya, 2005). It is important to note that issues such as commercialization of technology, programs for "techno-preneurs"^{iv} and technology benchmarking were underplayed in the Sessional Paper of 2005,

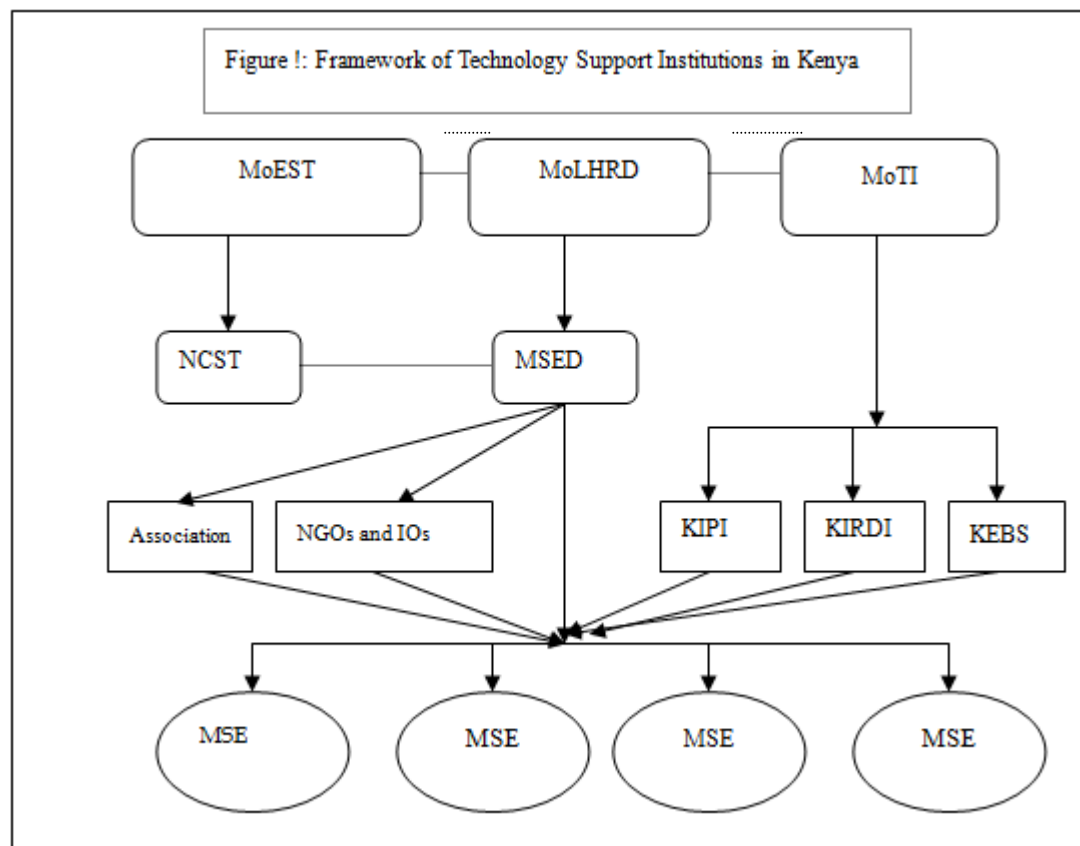
Despite the above policy pronouncements by Government, most of the policy proposals were not implemented (Aduda and Kaane, 1999). First, most MSEs still experience problems related to limited access to technological information and technical services and limited skills in technology management. The country lacks a national, coherent and comprehensive science, technology and innovation policy to guide technology-relevant decision making and the Science and Technology Act is outdated (is over 20 years old) and fails to take into account current developments in the areas of information technology and biotechnology. Second, the operating environment is characterized by dysfunctional innovation systems and weak linkages between MSEs and medium and large enterprises. Third, the country has failed to design a vision on technology for MSEs. Finally, MSEs are constrained by underdeveloped entrepreneurial skills, limited access to appropriate technology and limited access to electricity and telephone, which are key technological infrastructure.

Over the years, the Central Government held the monopoly in matters of MSE policy formulation. However, beginning in the late 1990s when the Poverty Reduction Strategy (PRS) paradigm in national planning was initiated, matters changed towards greater involvement of stakeholders and away from government monopoly. Thus, the *Sessional Paper No 2 of 2005* (Kenya, 2005), is one of the most participatory and inclusive of all the MSE policy documents, as it involved the Government, private sector and civil society.

3. Technological Support Institutions

Obviously, MSE and technology policies are not made or implemented in a vacuum, but within an institutional structure that varies from country to country. Ideally, policy formulation should be broad-based, inclusive and reflect the diverse interests in the sector. Such responsive institutional structures enhance the quality of MSE policy formulation and implementation.

There are many institutions ranging from those providing technology extension, quality and standards, protection of industrial property, innovation and technology development to those involved in policy formulation and planning (see Figure below). Other institutions originate technology policy and play an oversight role whereas others develop general policies on MSEs. These institutions range from government and quasi-Government to voluntary bodies. It is not possible to discuss all of them in such a study. We focus on the most critical. It is important that these institutions work together for smooth coordination of technological activities in the country.



Acronyms and abbreviations

MoEST	Ministry of Education, Science and Technology
MoLHRD	Ministry of Labor and Human Resource Development
MoTI	Ministry of Trade and Industry
NCST	National Council of Science and Technology
MSED	Department of Micro and Small Enterprise
IOs	International Organizations
KIPi	Kenya Industrial Property Institute
KIRDI	Kenya Industrial Research development Institute
KEBS	Kenya Bureau of Standards

3.1 MoLRD and MoTI

Government involvement in technology services for MSEs is usually justified on the basis of the perceived market failure in technology markets (Oyeyinka, undated). At the Central Government level, technology policy and support services are spearheaded by the Ministry of Labor and Human Resource Development - MLHRD (through MSED) and the Ministry of Trade and Industry (through the Department of Industry - DoI). The Ministry of Trade provides several services through parastatals that are established under it. These include Kenya Industrial Research and Development Institute (KIRDI), Kenya Bureau of Standards (KEBS) and Kenya Industrial Property Institute (KIPi).

The MSED was established to coordinate MSE activities in the country. Technology support services offered by the MSED include training and skills upgrading; engaging research and development institutions to re-orient their technology to the needs of MSEs; strengthening linkages between MSEs and large enterprises, universities and technical institutes and voluntary bodies; and improvement in adaptation of imported technology and consultancy services (Aduda, undated). The DoI was established to coordinate activities related to Small and Medium Enterprises (SMEs) as well as large industries.

Whereas MSE policy issues are executed by MLHRD, policy issues on SMEs fall within the Ministry of Trade and Industry. Further, supervision of the Institutes of Technology fall under the Ministry of Education Science

and Technology. This state of affairs has been criticized as leading to rivalry, duplication, increased wastage and causes confusion among stakeholders. As noted by Omolo and Omiti (2005), one of the problems with regard to implementation of policy is the straddling of MSE functions in several Ministries. Another limitation of public institutions is their low funding levels and weak linkages. With the proposed creation of the an MSE Technology Development Fund there is need to target resources from the private sector and the development partners to increase funding for technology related institutions.

3.2 National Council for Science and Technology

The National Science Council on Science and Technology (NCST) falls under the Ministry of Education, Science and Technology. According to the Science and Technology Act Cap 250 of 1977, the responsibilities of NCST's include;

- Determining priorities for scientific and technological activities
- Advising the Government on a national science policy including general planning and the assessment of the requisite financial resources;
- Ensuring the application of the results of scientific activities to the development of agriculture, industry and social welfare;
- Advising the Government on the scientific and technological requirements for the conservation of the natural and social environment;
- Ensuring cooperation and coordination between the various agencies involved in making the national science policy;
- Advising on all scientific activities that entail application of the results of research; transfer of technology into agriculture and industry; scientific and technical manpower; scientific and research technology funding; science education at all levels; and scientific documentation, statistics, surveys and general information among others;
- Advising on suitable organizational arrangements for planning, managing and coordination of scientific activities and setting up of new research committees, research councils, establishments and technical services;
- Advising the Government on the overall financial requirements for the implementation of the national science policy and advising on the programmes and budgets for the promotion of the research and related scientific activities;
- Carrying out independent or joint surveys and investigations as the Council may consider necessary for its tasks;
- Sponsoring national and international scientific conferences and establishing relationships with corresponding scientific organizations in other countries.

Several public research institutions were established under the Science and Technology Act. These include Kenya Agricultural Research Institute (KARI); Kenya Medical Research Institute (KEMRI); Kenya Trypanosomiasis Research Institute (KETRI); Kenya Forestry Research Institute (KEMFRI); and Kenya Industrial Research and Development Institute (KIRDI). In this study, we shall discuss KIRDI in some detail since it plays a central role in enhancing technological development within small enterprises.

Although the NCST was established to assess and advise on the adequacy of scientific and technological research and development carried in the country, it mainly engages in research that is supply-driven (rather than demand-driven) and its links with small scale industry are extremely weak. Publications of NCST reveal a top-down approach to science, instead of a grassroots, people-driven approach. Very little marketing or commercialization of the research output is done. The NCST's location in the capital city (Nairobi) makes it difficult for rural enterprises to access its services.

The NCST has failed to develop a national technology vision that should, in part, guide programmes for local and regional "techno-preneurs". Infact "techno-preneurs" are rarely represented in the highest levels of science and technical advice. Appointments to the NCST board (like other GoK boards) are political, with an emphasis on personal connections. Similarly, the NCST underwent many institutional changes. It was established under the Ministry of Research, Technical Training, and Technology. Over time, there were general structural changes in the ministries of the GoK. As a result, NCST's functions have been divided between Ministry of Labor (where the focus is on MSE's) and the Ministry of Education, Science, and Technology (where the focus is on academic and scientific research) and Ministry of Trade and Industry (where focus is on industrial research).

Even though the NCST was established to spearhead science and technology activities, the GoK has limited data

and information on science and technology activities in the country. The Central Bureau of Statistics has not coordinated data capture on innovation, technology research, transfer and dissemination. Very little information exists on technology activities within the country.

3.3 Kenya Industrial Research Development Institute

The Kenya Industrial Research Development Institute (KIRDI) was established in 1979. Since establishment, KIRDI has been offering technology related extension services to mainly Small and Medium manufacturing firms in the form of industrial training, consultancy services, product testing for quality assurance, information gathering, processing and dissemination and advisory services. The Institute is mandated by the Science and Technology Act (Cap 250) to conduct research in the following areas (a) civil and chemical engineering, (b) electronics, (c) mechanical engineering, (d) textiles, (e) fibers, (f) ceramics, (g) clays, (h) foods, (i) chemicals, (j) mining and, (k) the development of power resources.

The KIRDI stands out as only public institution that was created to cater for technology needs of industry. It was created to upgrade Kenya's technological and scientific capability, enhance technology transfer, adapt technology and disseminate good technology practices to local entrepreneurs (Kimuyu, 1999). The specific functions of KIRDI include^v;

- Identify and develop process and product technologies appropriate for the country's domestic market and export potential;
- Facilitate replacement of imported inputs with domestic ones;
- Aid and hasten transfer of technology through design development and adaptation of machinery, tools, equipment, instruments, and processes suitable for introduction in the country;
- Reduce the environmental problems deriving from industrial wastes and effluents by devising appropriate treatment or recovery methods;
- Establish pilot plants to demonstrate the operation and effectiveness of some industrial technologies developed through efforts of the institute;
- Provide industrial consultancy services to Kenyan manufacturers and to help in the commercialization of research findings;
- Raise local technological capability in order to facilitate exploitation of the country's resource potential;

Some of the achievements that the institute has made over the years include technologies in the following areas; extraction of essential oils, sorghum-based weaning products, cassava-based products, food processing equipment, leather from fish skin and so on. The Institute has established specialized facilities such as Leather Development Center, Engineering Development Center, National Industrial Information Center, Traditional Foods Development Center and the National Cleaner Production Center.

Despite the foregoing achievements, the Institute's activities are limited in the following ways. First, the products of KIRDI are limited by the absence of market-oriented research and development activities. This narrows the customer base and adoption of the Institute's products. Like many public institutions, the Institute suffers low funding levels, limiting its capacity to undertake cutting-edge research, which is fairly capital-intensive and expensive. Low funding also reduces the ability of the Institute to attract high caliber staff. Another shortfall relates to weak linkages between KIRDI and other Technological Research Organisations (such as Jomo Kenyatta University for Science and Technology) as well as weak linkages between KIRDI and MSEs. Such linkages are explained by poor dissemination of the results and weak networks.

3.4 Kenya Bureau of Standards

The Kenya Bureau of Standards (KEBS) is a statutory regulatory body, established by an Act of Parliament in 1974. It is responsible for promoting and enforcing the adoption of standards in industry and commerce with a view to improving quality; industrial efficiency and productivity; after-sales support services and all aspects of quality assurance. It serves all players in commerce including MSEs.

The KEBS is mandated by the Act to offer the following services: (1) Standards development (2) Product certification - Issuance of Diamond Mark of quality, (3) Quality system certification - ISO 9000/14000 registration, (4) Hazard Analysis and Critical Control Points (HACCP) system Certification - Codex HACCP Principles 1997, (5) Laboratory testing services, (6) Assistance of implementation of standards, (7) Metrology and calibration, (8) Quality inspection of imports at ports of entry, and (9) Training programmes and technical assistance.

The KEBS has supported the MSE sector in several ways. First, KEBS carries out quality assurance activities (mainly consultancy and technical advice) free of charge to entrepreneurs who have established production businesses. Quality assurance officers of KEBS are involved in sampling products for testing and issuing test certificates to the manufacturers at no cost. This is in line with the implementation of Kenya standards. In addition, KEBS laboratories are used to test both food and non-food products to establish the quality of these products. Some modest fee is charged for testing services, and this does not preclude MSEs.

The KEBS carries out training and advisory services on both Kenya and international standards. This is usually done either for groups of specific sectors at a cost of Ksh 40,000 (about US\$500) per day. In the past (before 2000), this was done in collaboration with donor organizations, which sponsored training for specific groups in different sectors but this is no longer the case. However, the fee of US\$500 may be well beyond the reach of most MSEs whose profit levels are low.

Another area of benefit to MSEs is the annual Kenya Quality Awards Scheme for all business categories run by KEBS. A special category for MSE competitors was designed to cater for the needs of MSEs. There is also a product certification scheme which helps MSE products to be more competitive in the local market as well as in regional markets. However, the permit to use the Diamond Mark in the product certification scheme is charged at Ksh 55,000.00 (US\$688) per year. Again, this cost does not respond to the needs of smaller enterprises.

3.5 Kenya Industrial Property Institute

The Kenya Industrial Property Office (KIPO) was established by the Industrial Property Act Cap. 509 in 1990 as a department of the Ministry of Research, Technical Training and Technology. However, Industrial Property Act 2001 established the Kenya Industrial Property Institute as a parastatal, to succeed KIPO. The main functions of the Institute include; (1) examining applications and granting industrial property rights, including patents, industrial designs and utility models; (2) Screening technology transfer agreements and licenses; (3) disseminating patent information to the public; (4) promoting inventiveness and innovation; (5) instituting infringement proceedings in relation to industrial property rights; and (6) registering and renewing trade marks and service marks.

Industrial property in Kenya covers the processing of patents, trademarks, service marks, industrial designs and utility models. There are certain aspects of intellectual property that fall outside the mandate of KIPI. Copyright is administered by the Copyright Board of Kenya under the Copyright Act 2001 while the Plant Varieties Act is administered by the Kenya Plant Health Inspectorate Services (KEPHIS).

One of the obvious questions is whether or not MSEs need IPRs. The World Intellectual Property Organization (see <http://www.wipo.int/sme>) considers IPRs important to small firms as they are to large businesses. This is because any business would usually have one or more trademarks, confidential business information or creative original designs, and may wish to use the intellectual property system to its own benefit. However, the main problems with intellectual property services as offered by KIPI include lack of packages designed to cater for MSEs. There are also problems related to low awareness among the entrepreneurs of the need to use the intellectual property system to protect their creative designs.

3.6 CSOs and International Organizations

Unlike the areas of credit and finance, the area of technology has not attracted many CSOs. There are few NGOs (Non Governmental Organizations) that are involved in enhancing the capacity of MSEs to create, adapt and use technology. The most prominent in this area include ApproTEC, Intermediate Technology Development Group (ITDG) and Kenya Gatsby Trust (KGT). At the international level, the prominent ones are the African Center for Technology Studies (ACTS) and Africa Technology Policy Studies Network (ATPS). The ITDG promotes the use of appropriate technology by providing training in their production to small-scale manufacturers. AproTEC supports MSEs through (a) research, design and development of technologies with potential for small enterprise creation; (b) training of manufacturers, new entrepreneurs, artisans and end users to manufacture and/or use appropriate technologies; and (c) Advocacy and promotion of proven new technologies.

Kenya Gatsby Trust Support for Carvers

Kenya Gatsby Trust (KGT) supports the enterprise sector to grow and increase productivity for poverty reduction and wealth creation. Currently, KGT's functional scope includes business development services, micro-finance services and technology based services. Under business development services, the KGT is working with three carvers' cooperatives namely; the Akamba Handicraft Society (with more than 5,000 carvers), Malindi Handicrafts Society (with over 2,400 members) and Machakos District Co-Operative Union (covering 8 primary associations with a combined membership strength of 2,300 members).

Challenges facing the carvers include; (1) the difficulty in minimizing wood shrinkage, movement, checking and cracking. In addition, the high moisture content of finished wooden carvings encourages the growth of unsightly surface moulds resulting in poor quality, lower value products hence trade losses. (2) There is increasing demand by international buyers for ethically sourced carvings. This means that buyers of woodcarvings are becoming more and more aware of the negative impacts caused by over-exploitation of forests through unsustainable harvesting of trees. To reverse the trend, they are insisting on those carvings coming from well-managed forests or certified ones. (3) Carving has over the years concentrated on traditional artifacts with limited market-led product development. The market for carving products is dynamic. This has adversely affected their market potential – impacting negatively on their incomes.

In this program, KGT has put in place a strategy to address the above technical challenges along the production process and to; (1) develop appropriate quality assurance system, (2) Facilitate the carvers in product development and design improvement by use of storyboards and digital imaging process (3) Facilitate certification of carvings with clear tracing system to verify that any wood products being classified as “certified” are really from managed sources. (4) Work with the Kenya Bureau of Standards to establish quality standards for neem products. (5) Carry out organizational analysis of Community Based Organizations (CBOs) with a view to identifying capacity building needs especially in line with product development, marketing development, and organizational management development. (6) Facilitate cultivation of neem commercially to reduce harvesting from wild and make the plant more attractive to overseas users who do not approve of putting natural resources at risk. (7) Link with ICIPE and other research organisations to develop gene banks and develop new varieties through experiments that are higher yielding and better for commercialization.

As is clear from the box above, CSO's have the advantage of working directly with the poor. They comprise that part of society that connects individuals with the public realm and the state. These organizations can make valuable contributions to policy formulation, support social service delivery, and safeguard rights. In this way, civil society organizations can be agents of poverty reduction and development. In Kenya, these organizations are involved in providing support services but their participation in policy formulation is minimal.

The ACTS and ATPS are somewhat involved in research and technology dissemination. Although International Research Centres help in solving national research and technological problems, most of their research priorities may not necessarily reflect immediate national development priorities, including the role of MSEs. Such centers were founded to cater for a cluster of countries with similar problems. Their level and reliability in funding is often impressive as is their manpower base and equipment. Kenya benefits through training opportunities, collaboration in programmes and shared facilities as well as through interaction between the scientists.

3.7 MSE Associations

Bennet (1998) and Helmsing (2000) identify MSE associations as an effective channels of providing extension services to their members. They do this by (1) disseminating and enforcing a stock of common quality, standards, rules and norms (2) disseminating technical knowledge within the sector, (3) providing a forum for technological learning and (4) functioning as channels through which local producers acquire crucial tacit knowledge for local adaptation, either directly or indirectly.

Table: Support services to MSEs

	Do you provide service to members?						Are you aware of any other support services within the MSE Sector?					
	Yes		No		All		Yes		No		All	
	N	%	N	%	N	%	N	%	N	%	N	%
Technology	42	22.0	149	78.0	191	100	67	34.4	128	65.6	195	100
Marketing	61	31.4	133	68.6	194	100	67	34.4	128	65.6	195	100
Workspace	84	43.1	111	56.9	195	100	108	55.7	86	44.3	194	100

Note: "N" is the number of respondents.

Source: Moyi (2006)

The table above indicates that a small proportion of MSE associations provided technology services to members. Similarly, very few respondents were aware of any other support services for technology within the sector. One of the reasons to explain this may be the objective of the associations. Most of the associations are formed for social welfare rather than to advance business interests of the MSEs. Again, even those associations that were formed with the objective of providing technical services, most have limited capacity to provide technological support services to MSEs.

Further results (Moyi, 2006) indicate that support services for technology are less effective. The associations were required to rank the effectiveness of the support services that they were aware of in the MSE sector. Regarding technology, about 56.4 per cent, 35.9 per cent and 7.7 per cent of the respondents indicated that the level of effectiveness was low, moderate and high, respectively.

4.0 Summary and Lessons

Given the forgoing following discussions and analysis, the following lessons are apt;

- It is not necessarily true that many institutions indicate an effective institutional framework. Rather, it is the extent of collaboration and networking among them that counts.
- Government's policy intentions need firm commitment from Government, especially from the political elite, for their translation from policy to implementation to materialize.
- The assumption that MSEs should be provided with technology support services since they do not innovate and produce knowledge has evolved a "top-down" culture that has failed to benefit MSEs. A change in perception should shift away from viewing MSEs as recipients of technology support towards viewing them as generators of technology products.
- Most policies fail to match responsible actors with specific tasks and budgetary resources making implementation difficult. In some instances, some actors are assigned tasks without consultation. This ends up assigning tasks even where the various players lack the requisite capacity to implement.
- A bureaucratic attitude among public officers may account for weak implementation of public policies. This is easy to discern: by seeing the way successive policies remain generic. This may reflect a lack of interest on the part of the officers to be creative and innovative as the Government migrates from one policy paper to another. Lack of interest in policy formulation would also result in lack of interest in implementation.
- When institutions carry ambiguous mandates, their commitment to implement public policy is diluted. When the accountability systems are weak, the result is that the expected beneficiaries of implementation suffer from the laxity of the state institutions.
- When the institutional framework (for providing technology support services) is heavily public sector dominated, the inefficiencies that characterize public service delivery seem to dominate the efficiencies of non-state efficient players – with result of a net inefficiency. Widening the scope for non-state actors therefore takes precedence.

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Notes

ⁱ In Kenya MSE are defined as enterprises having between 1-50 employees, with micro enterprises employing between 1 –10, small (11 – 50 employees), medium (51 – 100 employees) and large (over 100 employees).

ⁱⁱ These theories lay emphasis on technological change and accumulation of knowledge (education, on-job-training, innovation and inventions) as drivers of growth of enterprises and economies (see Ikiara et al, 2009).

ⁱⁱⁱ Such supporting services, infrastructures, institutions and enabling conditions are generally termed as "the National Innovation System".

^{iv} Refers to entrepreneurial individuals who are ready to take advantage of technology in responding to market signals.

^v See Ikiara (1988).

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